

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

Claim 1 (Previously Presented): A composite material comprising an active solid and a phase change material, wherein:

- the phase change material takes the form of micronodules having an average size of between 1 micron and 5 millimeters;
- the phase change material is selected from materials with a liquid/solid phase change temperature of between -150°C and 900°C;
- the active solid is selected from solids that can be used in a method involving reversible physicochemical processes that are exothermic in one direction and endothermic in the opposite direction.

Claim 2 (Previously Presented): A composite material comprising an active solid and a phase change material, wherein:

- the phase change material takes the form of micronodules having an average size of between 1 micron and 5 millimeters;
- the phase change material is selected from materials with a liquid/solid phase change temperature of between -150°C and 900°C;

- the active solid is selected from solids that can be used in a method involving reversible physicochemical processes that are exothermic in one direction and endothermic in the opposite direction,

wherein the active solid comprises a reactive solid that can be used in a reversible chemical reaction.

Claim 3 (Previously Presented): The composite material as claimed in claim 2, wherein the reactive solid is selected from halides, carbonates or hydroxides.

Claim 4 (Previously Presented): The composite material as claimed in claim 1, wherein the active solid comprises a porous and/or microporous solid that can be used in a reversible adsorption process.

Claim 5 (Previously Presented): The composite material as claimed in claim 4, wherein the porous and/or microporous active solid is selected from activated charcoals, zeolites, activated alumina or silica gels.

Claim 6 (Previously Presented): A composite material comprising an active solid and a phase change material, wherein:

- the phase change material takes the form of micronodules having an average size of between 1 micron and 5 millimeters;

- the phase change material is selected from materials with a liquid/solid phase change temperature of between -150°C and 900°C;

- the active solid is selected from solids that can be used in a method involving reversible physicochemical processes that are exothermic in one direction and endothermic in the opposite direction,
wherein the phase change material is a paraffin or a mixture of paraffins.

Claim 7 (Previously Presented): The composite material as claimed in claim 1, wherein the phase change material is a congruent melting salt.

Claim 8 (Previously Presented): The composite material as claimed in claim 7, wherein the congruent melting salt is selected from hydrated or unhydrated halides, hydrated or unhydrated carbonates, hydrated or unhydrated sulfates, phosphates, nitrates or hydroxides.

Claim 9 (Previously Presented): The composite material as claimed in claim 8, wherein the congruent melting salt is selected from CaBr_2 , CaCl_2 , KF , KCl , MgCl , NaCl , NaF , NH_4Cl , NH_4F , $\text{ZnCl}_2 \cdot 5\text{H}_2\text{O}$, $\text{KF} \cdot 4\text{H}_2\text{O}$, $\text{CaCl} \cdot 6\text{H}_2\text{O}$, $\text{LiClO}_3 \cdot 3\text{H}_2\text{O}$, MgSO_4 , ZnSO_4 , Na_2SO_4 , $\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$, $(\text{NH}_4)_2\text{SO}_4$, Na_2HPO_4 , NaH_2PO_4 , $\text{NH}_4\text{H}_2\text{PO}_4$, NH_4NC_3 , $\text{Al}(\text{NO}_3)_3$, $\text{Ca}(\text{NO}_3)_2$, $\text{Cd}(\text{NO}_3)_2$, KNO_3 , LiNO_3 , $\text{Mg}(\text{NO}_3)_2$, NaNO_3 , $\text{Ni}(\text{NO}_3)_2$, $\text{Zn}(\text{NO}_3)_2$, $\text{Zn}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}$, $\text{Cu}(\text{NO}_3)_2$, $\text{Ba}(\text{OH})_2$ or NaOH .

Claim 10 (Previously Presented): The composite material as claimed in claim 1, wherein the phase change material is a metal.

Claim 11 (Previously Presented): The composite material as claimed in claim 10, wherein the metal is selected from Al, Pb, Cu, Zn and alloys thereof.

Claim 12 (Previously Presented): The composite material as claimed in claim 1, wherein the active solid takes the form of particles or monoliths.

Claim 13 (Previously Presented): The composite material as claimed in claim 1, wherein the composite material comprises a porous or microporous active solid, in the form of monoliths or particles, the micronodules occupying the pores of the active solid.

Claim 14 (Previously Presented): The composite material as claimed in claim 1, wherein the composite material is formed by mixing particles or monoliths of active solid and micronodules, the micronodules occupying the spaces between the particles or the monoliths of active solid.

Claim 15 (Previously Presented): The composite material as claimed in claim 1, wherein the composite material comprises particles or monoliths of active solid on the surface of which the micronodules are fixed, either by chemical grafting or by bonding with an adhesive.

Claim 16 (Previously Presented): The composite material as claimed in claim 1, wherein the composite material comprises particles of active solid fixed on the surface of the micronodules by chemical grafting or by bonding with an adhesive.

Claim 17 (Previously Presented): The composite material as claimed in claim 1, wherein the composite material comprises a mixture of particles or monoliths of active solid, and particles of a support material on which the micronodules are fixed.

Claim 18 (Previously Presented): The composite material as claimed in claim 1, wherein the composite material comprises one or a plurality of monoliths of active solid in which the micronodules are distributed.

Claim 19 (Previously Presented): The composite material as claimed in claim 1, wherein the composite material further contains expanded natural graphite.

Claim 20 (Previously Presented): A method for controlling thermal effects in a reversible physicochemical process between an active solid and a gaseous compound, said process being exothermic in one direction and endothermic in the opposite direction, comprising controlling the thermal effects by using a composite material as claimed in claim 1 as active solid.

Claim 21 (Previously Presented): A method for purifying a gas mixture by adsorption and regeneration by pressure modulation, called the PSA method, comprising carrying out the successive steps of pressurization and depressurization of at least one adsorbent bed by a gas mixture, in order to separate the gas mixture, wherein the adsorbent bed(s) comprise(s) a composite material as claimed in claim 1.

Claim 22 (Previously Presented): The method as claimed in claim 21, for obtaining purified hydrogen from a gas mixture, wherein the gas mixture to be processed is a hydrogen-rich mixture further containing CO₂ and CM₄, and in that said mixture passes successively through two adsorbent beds, the first comprising activated charcoal and micronodules of phase change material, the second comprising zeolite and micronodules of phase change material.

Claim 23 (Previously Presented): The method as claimed in claim 21, for drying air, wherein the gas mixture to be processed is air containing water vapor and in that the adsorbent bed is a composite material comprising an alumina or a zeolite, and the micronodules are paraffin micronodules.

Claim 24 (Previously Presented): A method for storing gas by reversible adsorption on a porous solid, wherein the porous solid is a composite material as claimed in claim 4.

Claim 25 (Previously Presented): The method as claimed in claim 24, wherein the composite material comprises zeolite or activated charcoal.

Claim 26 (Previously Presented): A method for extracting oxygen from air by adsorption and regeneration by pressure modulation, called the VSA method, comprising carrying out successive steps of pressurization by air and of placing an adsorbent bed under vacuum, wherein the adsorbent bed comprises a composite material as claimed in claim 1.

Claim 27 (Previously Presented): The method as claimed in claim 26, wherein said material comprises a zeolite and a paraffin with a phase change temperature of about 290K.

Claim 28 (New): The composite material as claimed in claim 2, wherein the active solid comprises a porous and/or microporous solid that can be used in a reversible adsorption process.

Claim 29 (New): The composite material as claimed in claim 6, wherein the active solid comprises a porous and/or microporous solid that can be used in a reversible adsorption process.